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A NATION-WIDE STUDY OF THE BACTERIAL ETIOLOGY OF THE PNEUMONIAS [1]

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Acting upon recommendations of the National Advisory Committee on Prevention of Pneumonia Mortality, the United States Public Health Service in 1938 undertook to promote the development of demonstration programs designed to reduce pneumonia mortality, and to assist States, cities, and medical societies with the planning, organization, and conduct of such programs. As an inherent part of these control measures, clinical laboratory facilities were developed to provide for prompt and accurate bacteriologic diagnoses in pneumonia. Special emphasis was placed upon the type determination of pneumococci. Coincidentally, arrangements were made to amass information on the distribution of the various types of pneumococci and other pneumoniogenic organisms in several areas differing widely in pneumonia mortality. For this purpose 6 States were selected; viz, California, Colorado, Illinois, Louisiana, Missouri, and New Jersey. It may be noted from table 1 and the corresponding map (fig. 1) that these States represented both extremes of pneumonia-influenza mortality, 3 being among the highest fifth and 3 among the lowest fifth of the 48 States and the District of Columbia arranged in order of rank as to pneumonia and influenza death rates during the period covered by the study. It may be further noted that representative samples were obtained of all important areas characterized either by high or low pneumonia mortality. Although several practical considerations not related to the aforementioned requirements entered into the negotiations toward establishment of cooperative relationships, and affected the choice of fields of operation, the basic desiderata were achieved.

[1] From the Division of Public Health Methods, National Institute of Health.

TABLE 1.—*Pneumonia and influenza death rates by States. Yearly average 1939–40*

State	Rate per 100,000	State	Rate per 100,000
Conneticut	44.6	North Carolina	77.2
New Jersey [1]	52.2	Delaware	77.8
Oregon	53.8	New Hampshire	79.4
New York	53.9	Maine	80.3
California [1]	56.4		
Wyoming	56.6	West Virginia	81.6
Illinois [1]	58.4	Oklahoma	81.6
Kansas	58.8	Indiana	81.7
Rhode Island	61.0	Texas	83.7
Utah	[2] 61.4	District of Columbia	84.3
		Florida	86.6
Michigan	[2] 61.4	Vermont	90.8
Wisconsin	62.0	Mississippi	91.8
South Dakota	62.1	Arkansas	92.9
Washington	62.6	Virginia	93.0
North Dakota	63.4		
Nebraska	63.6	Missouri [1]	94.8
Massachusetts	67.2	New Mexico	95.8
Montana	67.4	Colorado [1]	96.1
Idaho	67.6	Kentucky	97.0
Minnesota	[2] 68.0	Alabama	97.4
		Georgia	97.6
Pennsylvania	[2] 68.0	South Carolina	99.1
Maryland	73.8	Louisiana [1]	103.8
Iowa	73.9	Tennessee	105.4
Ohio	74.4	Arizona	111.7
Nevada	76.7		

[1] Six States comprising the study area.
[2] The mortality rates for Utah, Michigan, Minnesota, and Pennsylvania were, respectively, 61.37, 61.40, 68.02, and 68.03.

In order to insure the utmost attainable reliability of bacteriologic diagnoses, a technician-training program and a performance-checking system were instituted. To secure uniformity in technical procedures and in interpretation of results, key bacteriologists were assigned to each of the 6 chosen areas, after receiving an intensive course of training of from 4 to 6 weeks in the Pneumonia Control Division of the Bureau of Laboratories of the New York City Department of Health. These bacteriologists then formed a cadre for the intensive training of medical diagnostic laboratory technicians from public and private laboratories in each of the 6 States. Seven hundred and twenty technicians availed themselves of this opportunity to participate in refresher courses, of 2 days' to a week's duration, subsidized by the State departments of health.

As a further safeguard, provision was made in each of the 6 States for control checks on the performance of technicians. In 5 of the States a system was established of reexamining, at intervals, specimens from various laboratories in the State by the Public Health Service bacteriologist. In 4 of these 5 States this plan was followed until well into the second year of the study-demonstration period, and 5,693 specimens from 5,198 cases were thus reexamined and checked. In the sixth State the practice of periodically submitting "unknown" specimens to each laboratory for diagnosis was followed. Under both systems, laboratories whose performance was found to

be imperfect were promptly assisted in overcoming their deficiencies. with gratifying results.

Under the reexamination plan adopted by 5 of the States, after removal of samples for examination by the local diagnostic laboratory, the specimens were promptly refrigerated without addition of

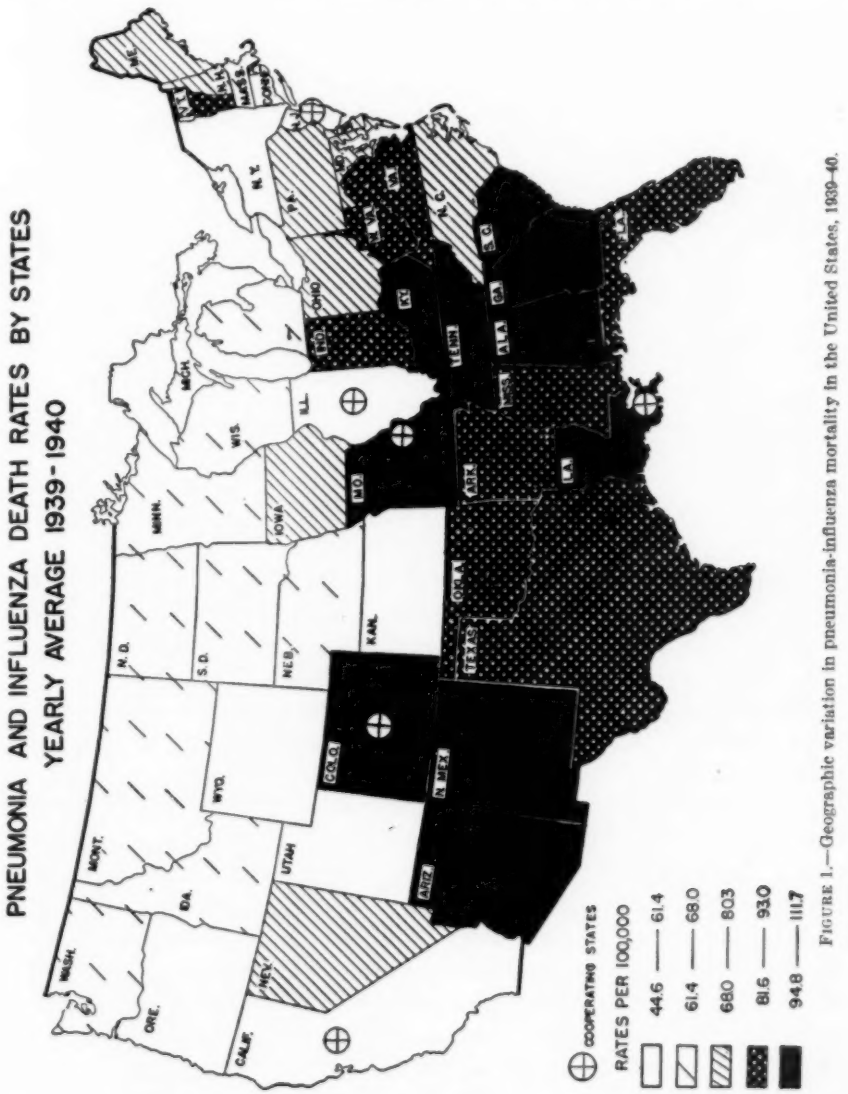

FIGURE 1.—Geographic variation in pneumonia-influenza mortality in the United States, 1939–40.

any preservative; they were then collected at intervals not exceeding 48 hours, and transported by messenger to the central control laboratory. As an alternate procedure, utilized in the case of a few outlying laboratories, specimens were shipped in vacuum-insulated jars, after several hours of preliminary refrigeration. No impairment

for purposes of pneumococcus typing was detected in specimens handled by either of the above methods. No difficulty was encountered in typing pneumococci present in specimens obtained after institution of sulfonamide therapy.

A total of 364 laboratories, including private and public hospital, private medical diagnostic, and public health laboratories, participated in the control programs and cooperated in the study. The number of laboratories in each classification is given in table 2.

TABLE 2.—*Classification of cooperating laboratories*

State	Laboratories				
	Private hospital	Public hospital	Medical diagnostic	Public health	Total
California	30	16	16	2	64
Colorado	29	6	14	4	53
Illinois	122	10	20	13	165
Louisiana	5	3	0	2	10
Missouri	20	4	4	1	29
New Jersey	32	3	0	8	43
6 States	238	42	54	30	364

GEOGRAPHIC SOURCES OF MATERIAL

The 3 States representing regions of low pneumonia and influenza mortality, and falling within the topmost one-fifth of the States arranged in the order of increasing death rates, were California, Illinois, and New Jersey; those representing regions of high mortality from the aforementioned causes, and falling within the bottom fifth, were Colorado, Louisiana, and Missouri.

California.—At the suggestion of F. A. Carmelia, the area selected for the study in this State consisted of the following 23 counties: Alameda, Amador, Calaveras, Colusa, Contra Costa, El Dorado, Lake, Marin, Napa, Placer, Sacramento, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Solano, Sonoma, Stanislaus, Sutter, Tuolumne, Yolo, and Yuba. These counties form a belt extending across the State, from the coast line to the eastern State boundary, and include a diversity of climatic and topographic conditions which may be placed in three broad categories; viz, an evenly cool low-altitude coastal zone, a central valley characterized by wide fluctuations of temperature, and a high-altitude mountainous zone. It was felt that this group of counties might approximate a fair cross-section of most of the State from the standpoint of climate, topography, and racial composition of the population. The number of patients studied was 2,754.

Colorado.—State-supported facilities for pneumonia typing and related bacteriologic examinations were first introduced in counties having organized health services, and were then gradually extended

to provide State-wide coverage. This extension paralleled that of the State pneumonia control program. A total of 1,867 patients was reached.

Illinois.—The comprehensive State public health laboratory system, with branch laboratories serving practically all populous sections, facilitated a rapid extension of diagnostic laboratory services, and stimulated a wider utilization of private hospital and clinical laboratories throughout the State. The study was further promoted by the concurrent development of a successful State pneumonia control program. The number of patients totaled 11,980.

Louisiana.—In the absence of an effective State pneumonia control program, and of coordination between the State public health laboratory and regional public health laboratories, the study area was essentially limited to the city of New Orleans. The number of patients studied was 2,799.

Missouri.—During the two study years, the State-supported program was limited to the city of St. Louis and St. Louis County. It was subsequently extended to all counties having organized health services. The number of patients included in the study was 3,327.

New Jersey.—A State-wide control program with complete laboratory facilities was provided at the outset and maintained throughout the period of the study. A total of 7,728 patients was reached.

CHARACTERISTICS AND COMPOSITION OF CLINICAL MATERIAL

The study covers the 24-month period from October 1, 1938, to September 30, 1940. For purposes of analysis this period has been divided into two 12-month periods; viz, October 1938 to September 1939, inclusive; and October 1939 to September 1940, inclusive. These have been designated as the first and the second years, respectively, of the study.

During the first study year bacteriologic examinations were made of 16,507 specimens from 13,006 patients, and during the second year, of 21,275 specimens from 17,449 patients—a total of 37,782 specimens from 30,455 patients. Both hospitalized and home-treated patients were included.

Of the 30,455 patients, 25,802, or 84.7 percent, had a diagnosis of pneumonia; of these, 15,420 were diagnosed as lobar pneumonia, and 6,092 as bronchopneumonia. Pneumonia diagnoses not anatomically specified, together with lobular and central pneumonias, accounted for the remaining 4,290 pneumonia cases. Other diagnoses totaling 2,290, or 7.5 percent of all cases, included respiratory diseases such as influenza, bronchitis, terminal, hypostatic, and unresolved pneumonias, and diseases complicating pneumonias, including meningitis, otitis media, mastoiditis, and sinusitis. In 2,363 cases, or 7.8 percent, the diagnosis was not recorded.

The final or discharge clinical diagnosis was obtained and recorded in approximately 81 percent of the diagnosed cases; in the remainder only the initial or tentative diagnosis was available.

The seasonal distribution of the pneumonia cases studied is shown diagrammatically in figure 2. The distribution was affected by expansion of several of the pneumonia control programs, especially in two of the low-mortality States.

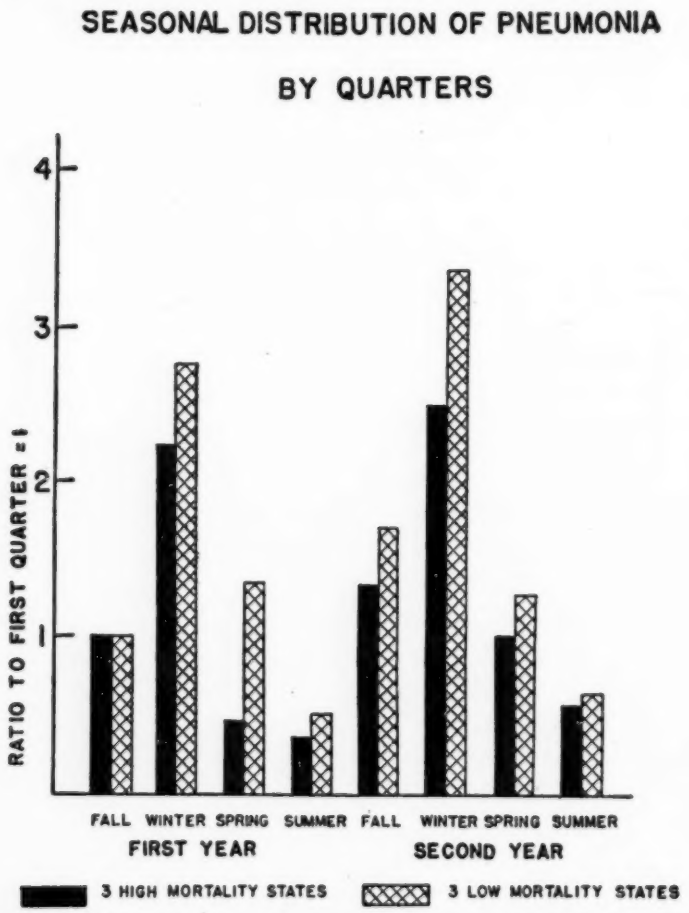

FIGURE 2.—Relative incidence of pneumonia by seasons over the 2-year study period, using number of cases in first fall quarter as a base. Comparative ratios for the three high-mortality and the three low-mortality States.

The distribution of patients according to race and sex is given in table 3. The percentages are based upon 29,621 cases of known race, and 30,383 cases of known sex. In each of the study areas the percentage of Negro patients was somewhat higher than the percentage of Negroes in the general population. The percentage of males among patients of the white race ranged from 56.8 to 68.1,

as compared with a range of 47.8 to 50.6 percent of males in the general white population in the study areas. Among Negro patients the range of percentages of males was 62.4 to 72.0 as against a range of 46.2 to 49.2 in the corresponding general population. For other races, the respective percentage ranges were 65.3 to 85.7 and 56.8 to 78.3. There was a marked excess of male patients in every one of the study areas. This disproportionately high incidence among Negroes and among males of all races is in consonance with previous observations of the pneumonias.

TABLE 3.—*Race and sex of patients*

State	White		Negro		Other races	
	Percent of patients	Percent male	Percent of patients	Percent male	Percent of patients	Percent male
California	94.6	68.1	1.7	71.1	3.7	65.3
Colorado	93.7	63.4	1.3	72.0	5.0	66.7
Illinois	88.7	61.7	11.0	64.9	.3	78.8
Louisiana	52.9	62.4	47.1	62.4	.0	----------
Missouri	73.6	56.8	26.4	62.5	.0	----------
New Jersey	86.3	63.7	13.6	66.0	.1	85.7
6 States	83.9	62.5	15.3	64.0	.8	68.1

METHODS AND RESULTS OF PNEUMOCOCCUS TYPING AND OTHER LABORATORY PROCEDURES

The cooperating laboratories examined 37,782 specimens. A somewhat larger number of specimens was submitted to laboratories, but those which were found unsuitable for examination have been excluded from tabulation. In 24,852 cases a single specimen was examined; in 5,603 cases, 2 or more specimens.

Each specimen was examined for pneumococci, type determination of which was based on demonstration of capsular swelling on contact with specific antipneumococcic serum. In order to promote achievement of comparable results, all typing serums were obtained from a single commercial source. As mentioned previously, an effort was also made to minimize variations caused by differences in technique. Uniformity of technique in pneumococcus typing was achieved to a high degree. Examination for other organisms and recording of the findings thereof were not as uniformly carried out, however.

Results of laboratory examinations are given in table 4, those of pneumococcus typing procedures in table 5. Specimens from 22,898 patients were reported to contain pneumococci. In 21,112 cases the pneumococci were identified as one of the then recognized serologic types. In 818 cases two or more types of pneumococci were demonstrated, but with one type clearly predominating. In 318 cases cross-reacting pneumococci were encountered which fell into

6 groups, tentatively designated as A to F, and which seemed to represent distinct types. In 243 cases multiple types were present, with no one type clearly predominating over the others. In 407 cases pneumococci were reported but had not been identified by type either because of the presence of too few organisms in the specimen or because of incomplete examination.

TABLE 4.—*Results of laboratory examinations—all diagnoses*

Specimen	Number of specimens			Percent positive					
				Pneumococci			Other organisms		
	2 years	First year	Second year	2 years	First year	Second year	2 years	First year	Second year
Sputum	27,800	12,019	15,781	76.2	76.6	75.8	5.9	5.2	6.5
Throat culture	3,224	1,305	1,919	67.7	58.7	73.9	14.0	8.6	17.7
Blood culture	5,307	2,506	2,801	72.4	70.7	73.9	5.9	5.3	6.4
Spinal fluid	260	92	168	86.9	79.3	91.1	6.2	6.5	6.0
Pleural fluid	513	262	251	77.2	75.2	79.3	10.9	8.8	13.1
Other	678	323	355	87.3	83.6	90.7	4.7	4.6	4.8
All specimens	37,782	16,507	21,275	75.2	74.4	75.8	6.7	5.5	7.5

TABLE 5.—*Results of pneumococcus typing—all diagnoses*

Typing procedure	2 years			First year			Second year		
	Number of cases	Percent of total	Percent positive	Number of cases	Percent of total	Percent positive	Number of cases	Percent of total	Percent positive
Direct test	19,226	63.1	81.7	7,741	59.5	82.2	11,485	65.8	81.3
Broth culture	2,995	9.9	69.4	1,020	7.8	60.6	1,975	11.3	74.0
Mouse inoculation	2,746	9.0	83.0	1,245	9.6	84.7	1,501	8.6	81.5
Other methods or combinations of methods	5,488	18.0	51.6	3,000	23.1	55.2	2,488	14.3	47.3
All methods	30,455	100.0	75.2	13,006	100.0	74.5	17,449	100.0	75.7

INCIDENCE OF CAUSATIVE ORGANISMS

The absolute incidence of the several categories of bacterial and other agents presumed to have been the infecting organisms is summarized in table 6. It will be noted that the pneumococci were held to be responsible for more than three-fourths of all pneumonias, and that the percentage of cases caused by this group of organisms in each pathologico-anatomic classification of the pneumonias was essentially the same in each of the two study years. The percentage of cases caused by hemolytic streptococci likewise remained fairly constant from one year to the next. The wider variations in the incidence of the other organisms might conceivably have been due in large part to their less frequent occurrence or recognition. The percentage of cases in which no significant organism was recorded was lower in the second year, possibly because of the increased experience of the laboratory technicians.

TABLE 6—*Incidence of etiologic organisms in 6 States, in percentage of organisms to total cases*

Causative organism	2 years					First year					Second year				
	Lobar pneumonia	Broncho-pneumonia	Unspecified pneumonias	All pneumonias	All diagnoses	Lobar pneumonia	Broncho-pneumonia	Unspecified pneumonias	All pneumonias	All diagnoses	Lobar pneumonia	Broncho-pneumonia	Unspecified pneumonias	All pneumonias	All diagnoses
Pneumococcus	82.48	65.79	77.48	77.71	75.18	83.24	62.85	77.63.	77.48	74.54	81.95	67.84	77.31	77.87	75.67
Streptococcus hemolyticus	2.00	3.33	3.99	2.65	3.02	1.83	3.04	3.65	2.48	2.69	2.13	3.53	4.39	2.77	3.27
Streptococcus, other	1.30	2.99	1.33	1.70	1.88	.51	1.44	.34	.68	.78	1.84	4.06	2.50	2.47	2.70
Staphylococcus	.82	2.00	1.38	1.19	1.24	1.10	2.52	1.89	1.58	1.52	.62	1.64	.76	.89	1.03
K. pneumoniae	.15	.13	.28	.17	.16	.18	.12	.43	.22	.22	.13	.14	.10	.13	.11
H. influenzae	.06	.25	.09	.11	.15	.06	.32	.13	.14	.19	.07	.20	.05	.10	.11
M. tuberculosis	----------	.08	----------	.02	.03	----------	.04	----------	.01	.02	----------	.11	----------	.03	.04
Fungus	----------	.02	----------	----------	.01	----------	.04	----------	.01	.01	----------	----------	----------	----------	.01
Virus	----------	----------	.07	.01	.01	----------	----------	----------	----------	----------	----------	----------	.15	.02	.02
No significant organism recorded	13.19	25.41	15.38	16.44	18.32	13.08	29.63	15.93	17.40	20.03	13.26	22.48	14.74	15.72	17.04
Number of cases	15,420	6,092	4,290	25,802	30,455	6,290	2,498	2,329	11,117	13,006	9,130	3,954	1,961	14,685	17,449

The relative incidence of the recognized serologic types of pneumococci is given in table 7. The incidence of each pneumococcus type is stated in terms of the percentage of cases caused by the designated type to all cases caused by pneumococci of which the type was determined. The number of type-determined cases in each diagnostic category represents the total of cases caused by single identified types, cases in which multiple types were identified with one type clearly predominating, and cases caused by recognized cross-reacting organisms. Excluded from the totals on which calculations were based were the cases caused by pneumococci the type of which had not been determined by reason of incomplete examination or insufficient number of organisms, and cases in which multiple types were identified with no one type clearly predominant.

The designation >XXXIII was applied to pneumococci which failed to react to any of the available typing serums. This entry is not comparable in the two study years as type XXXIII antipneumococcic serum became available only during the second year. Thus in the first year >XXXIII probably included cases that in the second year are separately classified as type XXXIII.

The pneumococcus type designations A to F were arbitrarily adopted to denote cross-reactors, as follows: A denotes organisms reacting to typing serums XI and XVI; B to combinations of VII, XX, and XXIV; C to various combinations of X, XI, XX, XXIX, and XXXI; D to XIV and XV; E to XXIII and XXVIII, and F to XV and XXIII.

The most prevalent types of pneumococci in each of the six study areas, and in the six States combined, are given in table 8. The types have been arranged in the rank order of their incidence in each study year, and in the entire study period.

The identity of the most prevalent types in each area remained quite constant from one year to the next, although their relative rank sometimes shifted. This shifting was least evident in the three areas which contributed the largest number of cases. Adjustment of type incidence percentages for the first year to the age distribution, by 10-year groups, of the second year in most instances resulted in a convergence of rates but not in an approximation of rank order.

The 10 most prevalent pneumococci in each State area accounted for 67.2 to 78.0 percent of all pneumonias caused by pneumococci of determined type during the 2-year period of the study. In the entire sample area the 10 leading pneumococci, viz, types I, II, III, IV, V, VI, VII, VIII, XIV, and XIX, accounted for 74.6 percent of all type-determined pneumococcic pneumonias.

TABLE 7.—*Pneumococcus type incidence in 6 States, in percentage of type to total type-determined cases*

Pneumococcus type	2 years					First year					Second year				
	Lobar pneumonia	Bronchopneumonia	Unspecified pneumonias	All pneumonias	All diagnoses	Lobar pneumonia	Bronchopneumonia	Unspecified pneumonias	All pneumonias	All diagnoses	Lobar pneumonia	Bronchopneumonia	Unspecified pneumonias	All pneumonias	All diagnoses
I	23.53	8.19	14.07	18.94	17.41	27.79	9.97	14.17	21.76	20.18	20.55	7.07	13.95	16.83	15.38
II	9.34	4.00	3.89	7.39	6.73	9.25	4.45	4.35	7.36	6.86	9.41	3.72	3.33	7.40	6.64
III	13.68	12.11	12.22	13.13	13.33	11.75	12.00	11.12	11.66	12.02	15.04	12.19	13.54	14.24	14.29
IV	4.60	5.07	4.38	4.65	4.58	4.53	5.32	5.03	4.77	4.78	4.64	4.91	3.61	4.56	4.43
V	4.60	2.37	3.05	3.90	3.66	4.84	2.22	2.99	3.99	3.75	4.42	2.45	3.13	3.84	3.60
VI	2.70	7.17	5.28	4.01	4.28	2.38	6.74	5.25	3.76	4.09	2.92	7.45	5.31	4.20	4.43
VII	9.46	5.35	6.48	8.16	7.67	9.48	4.79	6.27	7.97	7.55	9.45	5.71	6.73	8.30	7.76
VIII	7.87	5.59	7.41	7.34	7.14	7.86	6.00	8.08	7.58	7.31	7.87	5.33	6.60	7.16	7.02
IX	1.48	1.95	2.07	1.67	1.72	1.58	2.43	2.26	1.87	1.94	1.41	1.65	1.84	1.51	1.56
X	.95	1.59	1.70	1.20	1.29	.88	1.75	1.92	1.25	1.38	1.00	1.48	1.43	1.16	1.21
XI	.93	1.95	2.13	1.33	1.42	.96	1.75	2.03	1.33	1.40	.91	2.07	2.24	1.34	1.43
XII	1.09	.68	.89	.98	.96	1.09	.81	.90	1.00	.99	1.09	.59	.88	.96	.94
XIII	1.03	1.90	2.01	1.36	1.48	1.13	2.22	2.03	1.52	1.58	.96	1.69	1.97	1.25	1.42
XIV	3.09	4.50	3.30	3.40	3.39	2.91	4.58	3.33	3.30	3.16	3.22	4.44	3.26	3.49	3.55
XV	.86	2.26	1.85	1.30	1.46	.94	2.63	1.86	1.43	1.55	.81	2.03	1.84	1.20	1.38
XVI	.89	2.00	1.94	1.28	1.39	.78	1.75	2.09	1.23	1.36	.97	2.16	1.77	1.33	1.42
XVII	1.09	2.24	2.44	1.54	1.76	1.09	2.49	2.71	1.68	1.99	1.09	2.07	2.11	1.43	1.60
XVIII	1.67	2.96	2.59	2.08	2.25	1.56	2.22	2.71	1.92	2.14	1.75	3.43	2.45	2.20	2.33
XIX	2.34	7.38	4.20	3.64	4.05	1.99	7.08	3.84	3.28	3.49	2.58	7.58	4.63	3.91	4.47
XX	1.16	2.50	2.59	1.66	1.87	.86	1.75	2.77	1.42	1.49	1.37	2.96	2.38	1.84	2.15
XXI	.42	1.30	1.20	.72	.82	.25	1.01	1.13	.57	.67	.53	1.48	1.29	.83	.93
XXII	.79	1.61	2.04	1.16	1.22	.78	1.68	2.20	1.24	1.32	.79	1.57	1.84	1.09	1.14
XXIII	.92	2.62	1.76	1.40	1.60	.66	3.03	1.81	1.33	1.50	1.11	2.37	1.70	1.45	1.67
XXIV	.69	1.43	1.54	.98	1.05	.55	1.28	1.24	.82	.94	.79	1.52	1.90	1.09	1.14
XXV	.54	.57	.62	.56	.57	.59	.74	.62	.62	.59	.50	.47	.61	.51	.56
XXVII	.32	.31	.37	.33	.37	.21	.27	.00	.18	.21	.40	.34	.82	.44	.48
XXVIII	.59	1.33	1.11	.82	.96	.47	.94	1.13	.69	.85	.67	1.57	1.09	.91	1.03
XXIX	.72	2.21	2.13	1.24	1.29	.74	2.56	2.32	1.40	1.43	.70	1.99	1.90	1.13	1.20
XXXI	.43	.86	.65	.55	.63	.43	.88	.73	.57	.67	.44	.85	.54	.54	.60
XXXII	.22	.18	.15	.20	.21	.18	.14	.17	.17	.17	.26	.21	.14	.23	.23
XXXIII	.35	.62	.37	.40	.42	.00	.00	.00	.00	.00	.59	1.02	.82	.71	.72
>XXXIII	.76	2.73	1.88	1.33	1.59	.62	2.22	1.36	1.06	1.24	.86	3.05	2.52	1.54	1.84
A	.22	.68	.59	.37	.42	.23	.67	.51	.37	.44	.20	68	.68	.37	.41
B	.22	.62	.40	.33	.36	.25	.27	.28	.26	.31	.19	.85	.54	.38	.39
C	.37	.94	.40	.49	.49	.33	1.08	.45	.49	.50	.40	.85	.34	.48	.49
D	.03	.10	.15	.07	.07	.02	.14	.11	.06	.05	.04	.08	.20	.07	.08
E	.02	.08	.15	.06	.05	.02	.14	.23	.08	.08	.03	.04	.07	.04	.03
F	.03	.05	.00	.03	.04	.02	.00	.00	.01	.02	.04	.08	.00	.04	.05
Number of type-determined cases	12,447	3,847	3,241	19,535	22,248	5,125	1,484	1,771	8,380	9,396	7,322	2,363	1,470	11,155	12,852

TABLE 8.—*Rank of leading types of pneumococci in the pneumonias in 6 representative States*

6 STATES

Rank order	2 years		First year		Second year		First year adjusted	
	Type	Percent	Type	Percent	Type	Percent	Type	Percent
1	I	18.94	I	21.76	I	16.83	I	21.02
2	III	13.13	III	11.66	III	14.24	III	11.93
3	VII	8.16	VII	7.97	VII	8.30	VII	7.90
4	II	7.39	VIII	7.58	II	7.40	VIII	7.47
5	VIII	7.34	II	7.36	VIII	7.16	II	7.18
6	IV	4.65	IV	4.77	IV	4.56	IV	4.75
7	VI	4.01	V	3.99	VI	4.20	VI	4.00
8	V	3.90	VI	3.76	XIX	3.91	V	3.86
9	XIX	3.64	XIV	3.30	V	3.84	XIV	3.56
10	XIV	3.40	XIX	3.28	XIV	3.49	XIX	3.50
Percent of type-determined cases		74.56		75.43		73.93		75.17

CALIFORNIA

Rank order	2 years		First year		Second year		First year adjusted	
	Type	Percent	Type	Percent	Type	Percent	Type	Percent
1	III	13.26	I	15.21	III	14.06	I	14.03
2	I	11.10	III	12.52	VII	10.43	III	13.11
3	VII	9.84	VII	9.29	VIII	7.83	VII	9.01
4	VIII	7.19	II	6.86	I	6.67	IV	6.92
5	IV	5.72	IV	6.86	XIX	4.78	VIII	6.82
6	II	4.82	VIII	6.59	VI	4.64	II	6.09
7	VI	4.61	VI	4.58	IV	4.49	VI	4.72
8	XIX	4.26	XIX	3.77	XIV	3.91	XIX	3.86
9	XIV	3.70	XIV	3.50	XVII	3.19	XIV	3.79
10	XVII	2.65	V	2.96	II	2.61	V	3.06
Percent of type-determined cases		67.15		72.14		62.61		71.41

COLORADO

Rank order	2 years		First year		Second year		First year adjusted	
	Type	Percent	Type	Percent	Type	Percent	Type	Percent
1	I	16.08	I	18.39	I	14.78	I	17.13
2	II	15.25	II	16.55	II	14.52	II	16.87
3	III	12.45	III	8.97	III	14.40	III	10.31
4	VII	8.08	VII	6.44	VII	9.00	VII	6.95
5	VIII	4.95	VIII	6.44	V	4.11	VIII	6.17
6	VI	3.96	VI	4.83	VIII	4.11	VI	3.74
7	V	3.54	IV	3.22	XIX	3.60	IV	3.32
8	XIX	3.38	XIX	2.99	VI	3.47	XIX	3.12
9	IV	2.97	V	2.53	IV	2.83	V	2.64
10	XVIII	2.39	X	2.53	XVII	2.44	X	2.42
Percent of type-determined cases		73.05		72.89		73.26		72.67

TABLE 8.—*Rank of leading types of pneumococci in the pneumonias in 6 representative States*—Continued

ILLINOIS

Rank order	2 years		First year		Second year		First year adjusted	
	Type	Percent	Type	Percent	Type	Percent	Type	Percent
1	I	19.40	I	24.68	I	16.95	I	24.05
2	III	13.61	III	12.22	III	14.25	III	12.19
3	II	10.15	II	11.94	II	9.32	II	10.82
4	VII	8.27	VII	8.91	VII	7.98	VII	8.67
5	VIII	6.65	VIII	6.48	VIII	6.73	VIII	5.97
6	IV	4.25	IV	4.12	VI	4.77	IV	4.26
7	VI	4.11	XIX	2.85	IV	4.31	XIX	3.31
8	XIX	3.48	V	2.78	XIX	3.78	VI	3.22
9	V	3.28	VI	2.68	V	3.51	XIV	3.10
10	XIV	3.06	XIV	2.29	XIV	3.42	V	2.60
Percent of type-determined cases		76.26		78.95		75.02		78.19

LOUISIANA

Rank order	2 years		First year		Second year		First year adjusted	
	Type	Percent	Type	Percent	Type	Percent	Type	Percent
1	I	22.19	I	27.51	I	16.64	I	27.11
2	VII	10.64	VII	10.06	VII	11.25	VII	9.95
3	>XXXIII	7.02	III	6.95	>XXXIII	10.17	III	7.08
4	III	6.72	VIII	5.92	V	8.17	VIII	6.05
5	V	6.57	XIX	5.33	XIX	6.63	XIX	5.52
6	XIX	5.96	V	5.03	III	6.47	V	4.95
7	VIII	5.89	XIV	4.73	VIII	5.86	XIV	4.66
8	XIV	4.83	VI	3.99	XIV	4.93	VI	4.05
9	VI	4.15	>XXXIII	3.99	IV	4.47	IV	3.72
10	IV	4.08	IV	3.70	VI	4.31	XV	2.28
Percent of type-determined cases		78.05		77.21		78.90		75.37

MISSOURI

Rank order	2 years		First year		Second year		First year adjusted	
	Type	Percent	Type	Percent	Type	Percent	Type	Percent
1	I	18.95	I	19.29	I	18.59	I	19.05
2	III	13.68	III	13.17	III	14.21	III	14.37
3	VIII	8.79	VIII	9.54	VIII	8.01	VIII	10.48
4	VII	6.32	IV	6.02	VII	6.62	VII	6.18
5	IV	6.00	VII	6.02	IV	5.98	V	6.15
6	V	5.58	V	5.91	II	5.45	IV	5.68
7	II	4.68	VI	5.19	V	5.24	VI	4.33
8	VI	3.95	XIX	4.05	XIX	3.63	II	4.00
9	XIX	3.84	II	3.94	XIV	3.53	XIX	3.33
10	XIV	3.26	XIV	3.01	VI	2.67	XIV	2.26
Percent of type-determined cases		75.05		76.14		73.93		75.83

TABLE 8.—*Rank of leading types of pneumococci in the pneumonias in 6 representative States*—Continued

NEW JERSEY

Rank order	2 years		First year		Second year		First year adjusted	
	Type	Percent	Type	Percent	Type	Percent	Type	Percent
1	I	20.28	I	20.46	I	20.02	I	19.94
2	III	13.94	III	11.90	III	16.74	III	12.71
3	VIII	9.12	VIII	8.89	VIII	9.43	VIII	9.23
4	VII	7.50	VII	7.05	VII	8.12	VII	7.14
5	IV	5.14	IV	4.96	IV	5.40	IV	4.85
6	V	4.31	V	4.81	XIV	3.78	V	4.71
7	XIV	4.08	XIV	4.30	V	3.63	II	4.21
8	II	3.83	II	4.15	XIX	3.38	XIV	3.95
9	VI	3.63	VI	3.93	II	3.38	VI	3.88
10	XIX	3.08	XIX	2.87	VI	3.23	XIX	2.73
Percent of type-determined cases		74.91		73.32		77.11		73.35

SUMMARY

A State-Federal cooperative study was made over a 2-year period ended September 30, 1940, of the prevalence of pneumococci and other pneumoniogenic organisms in three States of very high pneumonia and influenza mortality, and in three States of relatively low pneumonia and influenza mortality. Each State, or area, represented a larger region of correspondingly high or low mortality. The study was intimately associated with the concurrent development of pneumonia control programs.

The arrangements which were made to insure uniformity in technical procedures and in the interpretation of results are described, as are the precautions taken to insure the utmost attainable reliability by a comprehensive system of performance checks.

The results of the examination of 37,782 laboratory specimens from 30,455 patients are tabulated and described. A more refined analysis and a consideration of the significance of the findings in the epidemiology of the pneumonias have been reserved for a separate publication.

The incidence of the various types of pneumococci and of other etiologic organisms in the pneumonias and the other respiratory diseases is shown for the six States by diagnostic categories. The leading types of pneumococci are indicated for each of the study areas. Over three-fourths of all pneumonias were found to be caused by pneumococci.

A comparison of the distribution of pneumococci in the several study areas shows that although there were differences as between regions, the relative prevalence of type organisms remained constant in each area from one year to the next.

During the 2-year period of the study, three-fourths of all pneumococcic pneumonias were caused by 10 types of pneumococci. These 10 most prevalent types were identical in each of the two study years. It is suggested that this observation might support a revision of current pneumococcus typing procedures in the direction of their simplification.

A STRAIN OF ENDEMIC TYPHUS FEVER VIRUS ISOLATED FROM HOUSE MICE (*MUS MUSCULUS MUSCULUS*) [1]

By GEORGE D. BRIGHAM, *Associate Bacteriologist*, and EDGAR G. PICKENS, *Scientific Aide, United States Public Health Service*

The virus of endemic typhus fever has been recovered repeatedly from the brains of rats in areas where this disease has been established. However, Mooser, Ruiz Castaneda, and Zinsser (*1*) in 1931, Lépine (*2*) in 1934, Lépine and Lorando (*3*) in 1936, and Zia (*4*) in 1938 (reported by Liu and Zia) failed to recover the virus from the brains of mice although the mice were trapped in infected foci. On the other hand, the endemic virus has been isolated from mice: Sparrow (*5*) in 1935 isolated 2 strains from 300 house mice in Tunis; Brigham (*6*) in 1937 isolated one strain from a native field mouse in Alabama, and Liu and Zia (*4*) in 1941 isolated one strain from 4 house mice in North China.[2] The authors can now report also having recovered the endemic typhus fever virus from house mice (*Mus musculus musculus*).

For a 6-month period starting in July 1941 a total of 248 house mice trapped in a control testing project[3] were utilized in an endeavor to recover the endemic typhus virus. Only the mice caught alive were employed. Their brains were pooled in groups of three to eight for inoculation. A strain was isolated from a pool of the brains of seven mice trapped in September. No attempts were made to test fleas from these mice. Rats caught in this area have been found infected with endemic typhus virus.

The mouse strain was identified as endemic typhus virus by passage through 28 guinea pig generations, 60 guinea pigs being employed. Fifty-eight of these animals developed clinical endemic typhus with scrotal reactions, one developed fever only, and one died of a secondary infection. Cross-immunity with three known endemic typhus fever strains was demonstrated and rickettsiae were found in smears

[1] From the Typhus Research Laboratory, Savannah, Ga., Division of Infectious Diseases, National Institute of Health.

[2] A paper by N. Petrov, "Epizootic of typhus among domestic mice in city of Tighina," (Misc. med. romana, **13**: 195-199, March-April 1940) is not available to us.

[3] Acknowledgment for trapping the mice is made to the Typhus Fever Control Testing Project, sponsored by the City of Savannah Health Department and the Georgia State Health Department, with the cooperation of the Work Projects Administration and United States Public Health Service.

from the tunica vaginalis of the passage guinea pigs. Dr. T. L. Perrin, of the Division of Pathology, reported finding characteristic typhus lesions in the brains of three passage guinea pigs. Eight white rats inoculated with the mouse strain produced agglutinins for Proteus OX 19.

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GROWTH MEASUREMENTS OF *ANOPHELES QUADRIMACULATUS* LARVAE

By Frederick L. Knowles, *Biophysicist, United States Public Health Service*

In the course of our studies on the effect of temperature, food, and other factors on the growth of *A. quadrimaculatus* larvae, we have measured the width of head and total length of several hundred larvae during each of their four instars. The width of head was chosen because it remains practically constant throughout each instar. In some instances the only method of distinguishing adjacent instars is by measurements of the width of head. Measurements of the total length are an index of overall growth and vary more than measurements of the width of head.

Boyd (*1*) says, "The newly emerged larva is somewhat more than a millimeter in length, with a disproportionately small head and narrow thorax as compared with the mature larva. It may attain a length of 2 mm. The second stage may attain a length of from 3 to 4 mm. passing to 5 or 6 in the third stage, while well-nourished fourth-stage anophelines may attain 8 mm. in length."

Measurements have been made of the head width and total length of *A. quadrimaculatus* larvae from the laboratory insectary. The colony of mosquitoes in our insectary are the Boyd strain and was started with eggs of mosquitoes from the Tennessee Valley Authority insectary. The insectary is maintained at 75°–76° F. Larvae are grown in pans containing tap water and to assure an ample food

supply, pulverized duck chow is sprinkled over the surface of the water daily.

Measurements of random samples were made using a micrometer disc which was calibrated with a stage micrometer ruled to 0.01 mm. The results of the measurements are summarized in table 1.

TABLE 1.—*Mean values of head width and total length of* A. quadrimaculatus *larvae during each of their four instars*

Instars	Number of measurements	Mean width of head in millimeters	Standard deviation	Mean total length of larvae in millimeters	Standard deviation
I	143	0.166±0.0004	0.004	1.272±0.0096	0.115
II	153	.265± .0007	.008	2.096± .0069	.085
III	174	.437± .0013	.018	3.015± .029	.382
IV	174	.709± .002	.021	6.226± .034	.448

Acknowledgement is made of the assistance of Under Scientific Helper Ernest E. Livingston in making the measurements.

Values shown in table 1 for mean total lengths of larvae for the four instar periods are somewhat less than those given by Boyd. However, values of length vary during each instar and, probably, depend to some extent on the kind and amount of food and other environmental conditions.

Wigglesworth (*2*), in discussing moulting and growth, mentions two empirical laws of growth: Dyar's rule and Przibram's rule. Dyar's rule implies that changes in linear dimensions from one instar to another follow a geometrical progression. According to Przibram's rule, "The weight is doubled during each instar and at each moult all linear dimensions are increased by the ratio 1.26 or $\sqrt[3]{2}$." Wigglesworth states that agreement with this rule is often so inexact that it becomes of no practical value. Bodenheimer (*3*) in summarizing growth measurement notes these disagreements and modifies Przibram's rule by stating that during each apparent instar the weight increases by a factor of 2 or $n.2$ and linear dimensions by $\sqrt{2}$ or $n.\sqrt{2}$.

By plotting against the number of instars the logarithm of both the width of the head and the total length, as in figure 1, straight lines may be fitted to both sets of values. Straight lines for the head width and total length have the formulae $W=0.164e^{0.49(n-1)}$ for the head width and $L=1.272e^{0.49(n-1)}$ for the total length, where n is the instar period (1, 2, 3, 4). Growth as shown by these measurements increases in a geometric progression with a ratio of approximately $e^{0.49}=1.63$, which is in conformity with Dyar's rule. Since both the width of the head and the total length of the larvae have the same growth ratio, there is some indication of "harmonic" growth as opposed to "heterogenic" growth.

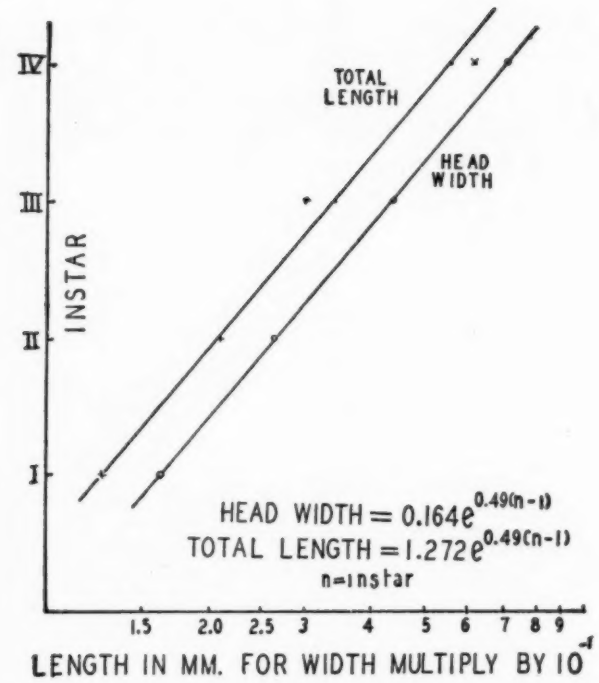

FIGURE 1

If we can presume, as Bodenheimer has done, that besides the four evident instar periods there may exist other latent divisions, approximate agreement with Przibram's rule is obtained for measurements of the width of head as shown in table 2.

TABLE 2.—*Comparison of observed and calculated means of head width and total length, showing conformity with the modified Przibram's rule*

Instar	Width of head in millimeters		Percent deviation	Ratio	Total length in millimeters		Percent deviation	Ratio
	Observed mean	Calculated mean			Observed mean	Calculated mean		
I	0.166	0.164	1.2		1.272	1.272	0	
Latent division		.209		1.274		1.625		1.278
II	.265	.267	0.8	1.278	2.096	2.078	0.9	1.279
Latent division		.342		1.281		2.650		1.275
III	.437	.437	0.0	1.278	3.015	3.390	12.0	1.279
Latent division		.558		1.277		4.330		1.277
IV	.709	.714	0.7	1.280	6.226	5.530	11.0	1.277
Average ratio				1.278				1.278

In table 2, in addition to the four actual instars, three latent instars are indicated. The ratio of the width of head and total length of one instar to the adjacent instar is approximately 1.278 which is very close to the value $1.26=\sqrt[3]{2}$ and is in accordance with Przibram's rule.

SUMMARY

Mean values are given for both the width of head and total length of *A. quadrimaculatus* larvae during each of their four instars.

Measurements show that *A. quadrimaculatus* larvae conform with Dyar's rule and have a growth ratio of approximately 1.635.

Conformity with a modified Przibram's rule is shown for width of the head and total length.

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MOUSE PROTECTIVE VALUES OF ANTIMENINGOCOCCUS SERUM IN COMPARISON WITH PRECIPITATION IN IMMUNE SERUM AGAR PLATES [1]

By MARGARET PITTMAN, *Bacteriologist, United States Public Health Service*

In 1938, Pittman, Branham, and Sockrider (*1*) reported that a definite correlation existed between the type-specific precipitins as estimated by the "plate" method and the mouse protective activity of the majority of antimeningococcus serums that they had studied. At that time a relatively small number of serums had been examined. The study was continued and in the present paper the results of the examination of 100 consecutive serums with reference to Group I antibodies are given. This larger number gives a better opportunity to determine the percentages of agreement or disagreement of the values of the serums as estimated by the two procedures.

In the previous report the results of the mouse protection tests were calculated by the method described by Reed and Muench (*2*). The same method was employed in this report and also a method described by White (*3*). The values obtained by the two methods were compared with each other as well as with the plate precipitation reaction of the corresponding serum.

The Reed-Muench method of estimating the mouse protective value of a serum is based upon the calculation of the dilution of serum that would protect 50 percent of the mice. The method described by White employs the formula $\frac{X}{Y}(a+a\frac{(S-S')}{N}$. X=largest amount of control serum injected, Y=largest amount of unknown serum injected, a=units per ml. in control serum, S=number of mice surviving on

[1] From the Division of Biologics Control, National Institute of Health.

unknown serum, S' = number of mice surviving on control serum, and N = total number of mice injected with all dilutions of any one serum.

The details of the procedures for the mouse protection test and for the plate precipitation test were described recently by Branham and Pittman (4). Both the protective and the precipitative values were estimated from the results of tests in relation to the findings obtained in similar tests which were carried out at the same time with the control serum M19. The Group I culture No. 1027 was used for each test. The serums labeled antimeningococcic serum, polyvalent, were either submitted by manufacturers for approval for release or collected on inspection. All were from horses. Two or more mouse protection tests were carried out on the majority of the serums.

In table 1 are summarized the results of the comparison of the mouse protective values of the serums as calculated by the two methods. It may be seen that the two values obtained for 69 of the 100 serums were within 10 percent of agreement with each other. For the remaining 31 serums there was considerable difference in the two values. Assuming that the value which more nearly corresponded to the amount of precipitation was the correct one, then the Reed-Muench value would have been correct for 25 of the serums and the White value correct for 6. Of the latter 6 for which the Reed-Muench value seemed to be incorrect, 5 were 14 to 45 percent too high and 1 was 12 percent too low. Of the 25 serums for which the White value seemed to be incorrect, 11 were 12 to 75 percent too high and 14 were 12 to 48 percent too low.

TABLE 1.—*Comparison of values of antimeningococcus serums calculated by the methods of Reed-Muench and White*

Number of serums	Agreement [1] of values obtained by both methods	Disagreement			
		White value agrees with plate precipitation		Reed-Muench value agrees with plate precipitation	
		Reed-Muench value		White value	
		Above	Below	Above	Below
100	69	3 (14-19%) 2 (40-45%)	1 (12%)	5 (12-20%) 3 (21-26%) 1 (36%) 2 (50-75%)	8 (12-20%) 4 (27-32%) 2 (41-48%)
		5	1	11	14
Total	69	6		25	

[1] Agreement within 10 percent.

In table 2 is given the summary of the relation of the plate precipitation reaction with the mouse protective value of each of the 100 serums. With 94 serums there was a definite correlation between the

amount of precipitation and the mouse protective value obtained by one or both methods of calculation, while with the remaining 6 there was disagreement. In the latter instances the 2 mouse protection values for each of 5 of the 6 serums were similar. For 2 of the 6 serums, the mouse protection value was only one-half of that which would have been expected from the amount of precipitation. The converse was true for the other 4 serums, that is, the mouse protective value was twice as great as would have been expected from the plate precipitation reaction.

TABLE 2.—*Relation of plate precipitation reactions and mouse protective values of 100 antimeningococcus serums*

Number of serums	Agreement of precipitation with one or both mouse protective values	Disagreement of precipitation with both mouse protective values [1]	
100	94	6	2—mouse protection equals one-half precipitation. 4 [2]—mouse protection equals two times precipitation.

[1] The Reed-Muench and White values of 5 serums were similar.
[2] White value of 1 serum was 16 percent lower than the Reed-Muench value.

In each of the tables it was recorded that there were 6 serums, or a total of 12, of which the Reed-Muench calculated mouse protective value did not agree with the amount of plate precipitation. A total of 31 White values failed to correspond. In other words, 88 percent of the values calculated by the Reed-Muench method were in agreement with the amount of precipitation while only 69 percent of the value calculated by the White method were in similar agreement.

Taking the mouse protective values as a whole, however, it appears that with 94 percent of the serums there was probably a definite correlation in the mouse protective value with the amount of plate precipitation of the Group I antibodies in antimeningococcus serums. Because of this high correlation, the plate precipitation test is of very great value both in determining the approximate dilutions of serum to be employed in the mouse protection test and in evaluating the results of the mouse protection test in the performance of which so many variables are encountered. The fact, however, that a few serums show a greater or lesser amount of precipitable antibodies than can be correlated with the mouse protective activity necessarily limits the use of the plate precipitation test.

SUMMARY

A comparison of the precipitation reaction in immune serum agar plates with the protection of mice by antimeningococcus serum was made with 100 serums. Only the work with Group I meningococcus is reported. Two methods were used in calculating the results of

the mouse protection test. The values obtained by the 50 percent endpoint determination described by Reed and Muench gave a higher degree of correlation than did the value obtained by the formula described by White.

With 94 of the serums a definite correlation was found in the amount of precipitation and the mouse protection value. With 2 serums the mouse protection activity was only one-half of that expected from the plate precipitation, while the converse was true with the remaining 4.

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PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

December 6, 1942–January 2, 1943

The accompanying table summarizes the prevalence of nine important communicable diseases, based on weekly telegraphic reports from State health departments. The reports from each State are published in the Public Health Reports under the section, "Prevalence of disease." The table gives the number of cases of these diseases for the 4-week period ended January 2, 1943, the number reported for the corresponding period in 1941, and the median number for the years 1937–41.

DISEASES ABOVE MEDIAN PREVALENCE

Meningococcus meningitis.—The incidence of this disease continued at a relatively high level, the 485 cases reported for the 4 weeks ended January 2, 1943 being about 3.3 times the normal seasonal expectancy (143 cases). Each section of the country contributed to the increase, but the largest excesses over the median incidence were reported from the Atlantic and Pacific coast regions. In the New England and Pacific regions the number of cases was more than 7 times the 1937–41 median figure, while in other regions the excesses ranged from almost twice the median in the West North Central and West South Central regions to almost 4½ times the median in the Mountain region. After reaching a relatively high peak in 1936, this disease declined rapidly

until the beginning of 1941; since then the disease has been more prevalent again and the total number of cases for the year 1942 was about 40 percent above the preceding 5-year average incidence. During 1942 the disease was most prevalent in the regions along the Atlantic coast and the Pacific region, but practically all regions have contributed to the excess.

Measles.—The number of cases (18,855) of measles was considerably above the median expectancy in the North Atlantic, Mountain, and Pacific regions, but the South Atlantic, North Central, and South Central regions reported a relatively low incidence. For the country as a whole the incidence was about 10 percent higher than in 1941, but it compared very favorably with the seasonal estimated expectancy.

DISEASES BELOW MEDIAN PREVALENCE

Diphtheria.—The incidence of diphtheria reached a new low level for this season of the year. For the 4 weeks ended January 2, 1943 there were 1,258 cases reported, as compared with 1,830 in 1941 and a median of 2,356 cases for the corresponding period in 1937–41. In the Pacific region the incidence stood at about the median level, but in all other regions the numbers of cases were relatively low.

Influenza.—The number of cases of influenza rose from approximately 7,000 cases during the preceding 4-week period to 10,734 for the current period. The incidence was, however, about 10 percent below the 1941 incidence, which figure (11,034 cases) also represented the 1937–41 median incidence for the period. The highest incidence was still confined to the South Atlantic, West South Central, and Mountain regions. Of the total number of cases, Texas reported 3,682; South Carolina 1,855; Virginia 1,419; Arizona 385; and Wyoming 319 cases—a total of 7,660 cases, or about 70 percent of the total cases.

The average mortality rate from all causes in large cities, based on data received from the Bureau of the Census, rose from 12.4 per 1,000 for the 4 weeks ended December 5 to 13.2 for the 4 weeks ended January 2, 1943. By weeks the rates were 13.0, 13.2, 12.3, and 14.1, respectively. As there was an increase in the number of cases of influenza during the month of December, it may be assumed that part at least of the excess death rate was due to respiratory diseases. (See Mortality, all causes.)

For the 4 weeks ended January 9, the latest data available, there were 3,822 cases of influenza reported as compared with 3,440 for the preceding 4-week period, and 10,709 deaths from all causes in large cities as compared with 10,222 for the 4 weeks ended January 2, 1943.

Poliomyelitis.—During the current period there were 214 cases of poliomyelitis reported, as compared with 251, 260, and 265 for the

corresponding period of 1941, 1940, and 1939, respectively. While the situation for the country as a whole was most favorable, the North Atlantic, West South Central, Mountain, and Pacific regions reported significant increases over the 1937–41 median figures for this period. Texas reported 71 cases, California 33, New York 10—a total of 114 cases occurred in those 3 States.

Scarlet fever.—The incidence of this disease was the lowest on record for this period. The number of cases (10,979) was about 95 percent of the number reported in 1941, and it was only about 75 percent of the 1937–41 median incidence for the same period. The New England and Mountain regions reported excesses over the normal seasonal expectancy, but in all other regions the incidence was relatively low.

Smallpox.—The number of cases of smallpox rose from 49 during the preceding 4-week period to 112 for the 4 weeks ended January 2, 1943. Of the total cases, Pennsylvania reported 34, Ohio and Indiana 18 each, and Texas 10—about 75 percent of the cases occurred in those 4 States. Sometime about the middle of November a person from Ohio with an active case of this disease attended a wedding in an Amish settlement in Pennsylvania and, according to special reports, by the end of December there were 55 cases reported, 9 of which occurred in Lewistown, Mifflin County, and 33 in Lancaster. The disease apparently was of a mild type, but vaccination proceedings were started at once. In 1941 the total cases reported for this period was 70, which was the lowest incidence on record for the period, the 1937–41 median for this period was 414 cases.

Typhoid and paratyphoid fever.—Typhoid fever was also relatively low, 251 cases being reported for the current period as compared with 414 for the corresponding period in 1941 and a 1937–41 median of 473 cases. In the New England, West North Central, and East South Central regions the incidence was about normal for this season of the year, but in other regions the disease was considerably less prevalent than in preceding years.

Whooping cough.—The number of cases (11,979) of whooping cough was approximately 90 percent of the 1941 figure for this period and about 80 percent of the 1937–41 median incidence. Of the 9 geographic regions, the New England, West North Central, West South Central, and Pacific regions reported excesses over the median, the East South Central region about the normal seasonal incidence, and in the Middle Atlantic, East North Central, South Atlantic, and Mountain regions the number of cases was below the seasonal expectancy.

MORTALITY, ALL CAUSES

The average mortality rate from all causes in large cities for the 4 weeks ended January 2, 1943, based on data received from the Bureau of the Census, was 13.2 per 1,000 inhabitants (annual basis),

an increase over the preceding 4-week period of approximately 7 percent. The current rate also represented an increase of almost 10 percent over the preceding 3-year average rate for the corresponding period. The recent increase in the death rate does not appear to be confined to any one locality. An increase in the number of cases of influenza for the country as a whole and also an increase in the mortality from influenza and pneumonia in cities reporting this information to the Public Health Service would indicate that the respiratory diseases are responsible for a large part of the increase. However, these rates are based on the April 1940 population and the lack of accurate current urban populations and possible changes in the age distribution are as yet undetermined factors in the current rates.

Number of reported cases of 9 communicable diseases in the United States during the 4-week period December 6, 1942–January 2, 1943, the number for the corresponding period in 1941, and the median number of cases reported for the corresponding period, 1937–41

Division	Current period	1941	5-year median	Current period	1941	5-year median	Current period	1941	5-year median
	Diphtheria			Influenza [1]			Measles [2]		
United States	1,258	1,830	2,356	10,734	11,034	11,034	18,855	17,320	18,196
New England	18	34	34	21	12	21	3,661	1,919	1,435
Middle Atlantic	131	137	271	121	82	97	6,233	3,699	3,699
East North Central	168	260	378	341	310	494	1,655	1,259	1,836
West North Central	88	94	135	151	157	316	1,100	1,427	1,427
South Atlantic	261	516	574	3,755	2,638	2,638	226	3,133	1,942
East South Central	136	212	246	662	485	1,415	224	603	603
West South Central	272	425	401	4,444	6,124	3,076	434	1,463	470
Mountain	68	75	80	1,002	808	851	2,464	1,384	857
Pacific	116	77	115	237	418	418	2,858	2,433	2,433
	Meningococcus meningitis			Poliomyelitis			Scarlet fever		
United States	485	143	143	214	251	251	10,979	11,281	14,672
New England	68	19	9	5	25	2	1,390	1,250	858
Middle Atlantic	109	33	33	18	56	12	2,122	2,387	2,610
East North Central	54	16	16	18	32	23	3,114	3,351	4,702
West North Central	21	13	11	19	17	23	1,190	1,323	1,852
South Atlantic	97	21	25	15	26	24	1,080	1,297	1,168
East South Central	11	19	19	10	51	18	479	773	730
West South Central	23	13	13	75	20	20	315	388	442
Mountain	31	3	7	15	5	5	640	402	500
Pacific	71	6	10	39	19	19	649	650	885
	Smallpox			Typhoid and paratyphoid fever			Whooping cough [2]		
United States	112	70	414	251	414	473	11,979	13,465	[3] 14,356
New England	0	0	0	16	23	18	1,826	1,326	1,454
Middle Atlantic	34	0	0	25	63	69	3,266	3,801	4,113
East North Central	44	18	79	30	65	65	3,076	3,987	3,748
West North Central	10	24	165	27	14	26	559	541	503
South Atlantic	4	1	3	39	104	90	898	1,126	1,358
East South Central	4	6	3	32	31	31	391	401	391
West South Central	14	16	57	48	67	115	740	456	422
Mountain	2	2	111	21	13	32	331	686	448
Pacific	0	3	20	13	34	34	892	1,141	887

[1] Mississippi, New York, and Pennsylvania excluded; New York City included.
[2] Mississippi excluded.
[3] 4 years (1938–41) only.

DEATHS DURING WEEK ENDED JANUARY 9, 1943

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Jan. 9, 1943	Corresponding week 1942
Data from 90 large cities of the United States:		
Total deaths	10,709	9,849
Average for 3 prior years	9,840	----------
Deaths under 1 year of age	784	618
Average for 3 prior years	589	----------
Data from industrial insurance companies:		
Policies in force	65,266,075	64,833,337
Number of death claims	12,793	11,660
Death claims per 1,000 policies in force, annual rate	10.2	9.4

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED JANUARY 16, 1943

Summary

Meningococcus reports for the week ended January 16 totaled 298 cases as compared with 278 for the preceding week and a 5-year (1938–42) median of 46. The largest numbers were reported in States as follows, with figures for the preceding week in parentheses: California, 30 (13); Missouri, 25 (7); New York, including 15 in New York City, 23 (23); Virginia, 20 (30); Maine, 19 (16); Pennsylvania, South Carolina, and Oregon, 16 each, and Washington, 14.

A total of 4,330 cases of influenza was reported, as compared with 3,852 for the preceding week and a 5-year median of 3,894, reported for the corresponding week in 1942. The number for the week in 1941 was 95,695. Of the current total, 68 percent was reported in the 3 States heretofore reporting the greatest prevalence, Texas 1,582, South Carolina 854, and Virginia 489.

Reports of poliomyelitis for the week totaled 46 cases as compared with 34 last week and a 5-year median of 29. The current total is above that reported for the corresponding week of any year since 1932 and includes 9 cases in Texas, 7 in California, 4 in Michigan, and 3 each in New York and Kansas.

The number of smallpox cases reported decreased from 42 to 39 for the current week, 13 of which were in Indiana, 10 in Pennsylvania, and 6 in Ohio. The corresponding 5-year median is 110.

The total number of measles cases reported for the week, 8,225, is only slightly above the preceding week's figure of 8,182, and is 17 percent less than the comparable 5-year median. The highest prevalence is in the Middle Atlantic, New England, Pacific, and East North Central States, in the order named.

The reported numbers of cases of diphtheria, scarlet fever, and typhoid fever are below the respective 5-year medians, although a slight increase over the preceding week was shown for scarlet fever.

Whooping cough figures are slightly above those for both the preceding week and the 5-year median.

Other reports for the week include 201 cases of dysentery (17 amebic, 141 bacillary, and 43 unspecified); 12 cases of infectious encephalitis; 14 cases of tularemia, and 70 cases of typhus fever.

For the current week deaths in 90 large cities of the United States aggregated 10,316; for the preceding week, 10,709. The 3-year average (1940–42) is 9,678. The accumulated figures for the first 2 weeks are: 1943, 21,022; 1942, 19,656. (NOTE.—Rates have been discontinued owing to the lack of accurate urban population estimates.)

Telegraphic morbidity reports from State health officers for the week ended January 16, 1943, and comparison with corresponding week of 1942 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1938–42	Week ended—		Median 1938–42	Week ended—		Median 1938–42	Week ended—		Median 1938–42
	Jan. 16, 1943	Jan. 17, 1942		Jan. 16, 1943	Jan. 17, 1942		Jan. 16, 1943	Jan. 17, 1942		Jan. 16, 1943	Jan. 17, 1942	
NEW ENG.												
Maine	0	0	3	------	1	7	16	187	70	19	2	0
New Hampshire	0	0	0	------	------	------	173	8	8	0	0	0
Vermont	0	0	0	------	------	------	304	14	14	0	0	0
Massachusetts	2	0	3	------	------	------	450	236	236	12	3	1
Rhode Island	2	5	0	------	------	------	9	40	5	20	0	0
Connecticut	0	0	0	4	2	6	358	146	146	4	2	1
MID. ATL.												
New York	16	24	25	[1] 22	[1] 14	[1] 14	852	348	389	23	5	5
New Jersey	8	2	7	26	10	18	331	112	112	8	1	1
Pennsylvania	19	12	28	2	------	------	1,841	1,463	1,463	16	4	4
E. NO. CEN.												
Ohio	15	4	28	14	35	35	61	84	84	0	2	1
Indiana	12	14	16	8	26	25	152	31	31	2	1	1
Illinois	7	28	37	11	21	28	176	89	89	3	4	4
Michigan [2]	7	4	7	5	1	2	135	88	440	3	2	1
Wisconsin	6	1	1	147	16	48	437	439	439	2	0	0
W. NO. CEN.												
Minnesota	4	5	4	2	2	2	14	177	177	0	0	0
Iowa	10	0	6	------	------	5	44	134	134	0	0	0
Missouri	5	5	14	10	5	59	46	54	40	25	2	0
North Dakota	0	0	0	46	13	13	8	85	11	0	1	0
South Dakota	1	2	2	------	2	1	162	9	6	1	0	0
Nebraska	7	1	3	28	------	------	140	11	10	1	0	0
Kansas	4	12	11	4	16	32	68	165	148	8	0	0
SO. ATL.												
Delaware	0	2	2	------	------	------	2	2	2	0	0	0
Maryland [2]	12	4	6	22	10	15	10	177	12	10	10	0
Dist. of Col	1	3	3	4	1	2	13	8	7	4	0	0
Virginia	11	11	21	489	348	420	79	141	168	20	3	3
West Virginia	8	7	14	14	11	37	7	189	189	1	0	0
North Carolina	11	16	25	17	8	26	14	451	434	3	2	2
South Carolina	2	11	7	854	493	673	5	122	70	16	0	1
Georgia	2	7	13	157	93	136	13	259	72	2	0	0
Florida	4	4	5	------	14	14	3	45	45	1	0	0
E. SO. CEN.												
Kentucky	11	5	15	15	6	61	197	26	26	7	1	2
Tennessee	4	5	7	63	92	184	16	98	74	6	1	3
Alabama	8	18	15	265	281	300	11	27	68	8	2	3
Mississippi [2]	9	8	8	------	------	------	------	0	------	0	2	1
W. SO. CEN.												
Arkansas	11	16	16	158	212	212	57	127	30	4	0	0
Louisiana	5	10	13	9	4	36	26	20	2	3	1	1
Oklahoma	8	13	14	67	116	149	52	129	15	2	0	0
Texas	35	60	57	1,582	1,561	895	63	650	216	5	7	2
MOUNTAIN												
Montana	1	0	1	7	8	17	26	59	11	0	0	0
Idaho	0	4	1	1	5	5	81	10	10	0	0	0
Wyoming	0	0	1	36	36	24	8	22	8	2	1	0
Colorado	15	9	12	46	68	68	78	322	108	2	0	1
New Mexico	0	1	2	4	4	4	1	120	120	1	0	0
Arizona	2	0	4	83	165	165	7	88	10	2	2	0
Utah [2]	1	0	0	12	1	1	374	24	27	2	1	0
Nevada	0	0	------	------	------	------	3	5	------	1	0	------
PACIFIC												
Washington	13	2	1	1	5	4	717	25	50	14	0	1
Oregon	2	0	1	27	28	39	373	65	60	16	0	0
California	29	18	18	68	160	160	212	1,135	326	30	6	1
Total	330	353	543	4,330	3,894	3,894	8,225	8,266	9,857	309	68	46
2 weeks	702	758	1,031	8,182	7,694	7,694	16,407	16,158	16,527	587	113	130

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended January 16, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1938–42	Week ended—		Median 1938–42	Week ended—		Median 1938–42	Week ended—		Median 1938–42
	Jan. 16, 1943	Jan. 17, 1942		Jan. 16, 1943	Jan. 17, 1942		Jan. 16, 1943	Jan. 17, 1942		Jan. 16, 1943	Jan. 17, 1942	
NEW ENG.												
Maine	2	0	0	17	28	16	0	0	0	0	2	1
New Hampshire	0	0	0	9	14	8	0	0	0	0	0	0
Vermont	0	0	0	8	2	6	0	0	0	0	0	0
Massachusetts	2	0	0	366	299	191	0	0	0	0	4	2
Rhode Island	0	0	0	16	12	4	0	0	0	0	0	0
Connecticut	0	0	0	74	30	72	0	0	0	0	3	1
MID. ATL.												
New York	3	6	1	399	318	419	0	0	0	4	1	8
New Jersey	0	1	0	103	104	173	0	0	0	1	0	1
Pennsylvania	1	0	0	285	271	308	10	0	0	2	6	6
E. NO. CEN.												
Ohio	1	2	2	269	267	354	6	0	1	1	2	4
Indiana	0	0	0	83	135	150	13	1	5	2	1	1
Illinois	0	1	1	223	231	433	1	0	2	0	3	3
Michigan [2]	4	0	1	100	173	321	0	0	2	0	1	2
Wisconsin	0	0	1	336	141	141	0	0	6	0	1	0
W. NO. CEN.												
Minnesota	0	1	1	92	77	124	0	1	13	1	2	1
Iowa	1	1	0	63	30	91	2	0	13	2	2	0
Missouri	1	0	0	98	92	92	0	5	5	1	1	2
North Dakota	0	0	0	8	15	20	0	0	1	0	0	0
South Dakota	1	0	0	23	53	22	0	0	1	0	0	0
Nebraska	0	0	0	21	60	39	0	0	1	0	0	1
Kansas	3	0	0	63	93	135	0	0	2	0	0	0
SO. ATL.												
Delaware	0	0	0	5	33	17	0	0	0	0	1	0
Maryland [2]	0	0	0	66	53	53	1	0	0	8	1	1
Dist. of Col.	0	0	0	25	12	13	0	0	0	2	0	0
Virginia	1	0	0	52	32	54	0	0	0	1	5	2
West Virginia	0	0	0	28	61	66	0	0	0	1	1	2
North Carolina	1	0	0	50	49	63	0	0	0	2	0	3
South Carolina	0	0	0	19	9	9	1	0	0	0	1	1
Georgia	1	1	0	27	20	24	0	0	0	1	6	4
Florida	0	0	1	5	7	8	0	0	0	0	0	2
E. SO. CEN.												
Kentucky	2	0	1	51	70	70	0	0	0	1	0	0
Tennessee	0	1	1	58	64	57	0	0	0	0	4	2
Alabama	1	2	1	15	36	26	2	1	0	2	0	1
Mississippi [2]	0	2	0	13	8	9	0	0	0	0	1	1
W. SO. CEN.												
Arkansas	1	2	2	10	10	13	0	0	3	2	3	2
Louisiana	0	0	0	14	4	15	0	0	0	3	8	7
Oklahoma	0	0	0	8	33	39	0	1	2	2	0	2
Texas	9	1	1	59	46	61	0	0	2	0	4	8
MOUNTAIN												
Montana	0	3	0	9	42	42	0	0	0	0	0	0
Idaho	0	0	0	12	14	14	0	1	1	2	0	0
Wyoming	0	0	0	58	10	8	0	0	0	0	0	0
Colorado	0	1	0	53	38	38	0	0	15	0	1	1
New Mexico	1	0	0	1	7	14	0	0	0	0	0	1
Arizona	1	0	0	9	3	7	0	1	1	0	0	1
Utah [1]	0	0	0	90	26	26	0	0	0	0	1	0
Nevada	0	0	------	------	0	------	0	0	------	0	0	------
PACIFIC												
Washington	1	0	0	30	31	49	0	0	2	0	0	1
Oregon	1	0	0	22	14	23	3	0	3	0	1	3
California	7	4	3	192	115	161	0	0	0	0	3	2
Total	46	29	29	3,637	3,292	4,134	39	11	110	41	70	86
2 weeks	80	57	57	7,094	6,393	7,731	81	21	184	94	154	162

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended January 16, 1943—Continued

Division and State	Whooping cough			Week ended Jan. 16, 1943								
	Week ended—		Median 1938-42	Anthrax	Dysentery			Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
	Jan. 16, 1943	Jan. 17, 1942			Amebic	Bacillary	Unspecified					
NEW ENG.												
Maine	122	34	42	0	0	0	0	0	0	0	0	0
New Hampshire	1	3	3	0	0	0	0	0	0	0	0	0
Vermont	52	32	32	0	0	0	0	0	0	0	0	0
Massachusetts	256	202	202	0	0	1	0	1	0	0	0	1
Rhode Island	19	119	33	0	0	0	0	0	0	0	0	0
Connecticut	92	150	108	0	0	1	0	1	0	0	0	0
MID. ATL.												
New York	473	577	540	0	1	17	0	0	0	0	0	0
New Jersey	194	227	164	0	1	0	0	0	0	0	0	0
Pennsylvania	373	310	414	0	0	0	0	0	0	0	0	0
E. NO. CEN.												
Ohio	282	221	221	0	0	0	0	0	0	0	0	0
Indiana	35	59	36	0	0	0	0	0	0	0	0	0
Illinois	177	225	121	0	1	0	0	1	0	0	0	0
Michigan [1]	414	181	184	0	0	2	0	0	0	0	0	0
Wisconsin	231	261	182	0	0	0	0	0	0	0	0	0
W. NO. CEN.												
Minnesota	66	56	56	0	2	0	0	0	0	0	0	0
Iowa	30	11	12	0	0	0	0	1	0	0	3	0
Missouri	30	22	22	0	0	0	0	0	0	0	0	0
North Dakota	21	2	13	0	0	0	0	1	0	0	0	0
South Dakota	2	7	4	0	0	0	0	0	0	0	0	0
Nebraska	1	6	5	0	0	0	0	0	0	0	0	0
Kansas	48	56	56	0	0	0	0	0	0	0	0	1
SO. ATL.												
Delaware	10	1	6	0	0	0	0	0	0	0	0	0
Maryland [2]	95	84	80	0	0	0	5	0	0	0	1	0
Dist. of Col.	13	32	10	0	0	0	0	0	0	0	0	0
Virginia	90	22	53	0	0	0	19	0	0	0	1	0
West Virginia	31	24	36	0	0	0	0	0	0	0	0	0
North Carolina	85	197	284	0	0	0	0	0	0	0	0	1
South Carolina	31	66	66	0	0	1	0	0	0	0	0	7
Georgia	31	13	14	0	3	0	0	0	0	0	0	17
Florida	10	21	11	0	0	0	0	0	0	0	0	1
E. SO. CEN.												
Kentucky	55	89	14	0	0	0	0	0	0	0	3	0
Tennessee	82	32	26	0	0	0	0	2	0	0	4	1
Alabama	41	5	28	0	0	0	0	0	0	0	0	10
Mississippi [2]	------	0	------	0	0	0	0	0	0	0	0	0
W. SO. CEN.												
Arkansas	22	11	11	0	1	0	0	0	0	0	0	0
Louisiana	1	4	4	0	1	1	0	0	0	0	0	1
Oklahoma	8	6	6	0	0	0	0	0	0	0	0	0
Texas	227	88	96	0	2	109	0	1	0	0	0	30
MOUNTAIN												
Montana	27	9	9	0	0	0	0	0	0	0	0	0
Idaho	2	6	6	0	0	0	0	0	0	0	0	0
Wyoming	9	8	8	0	0	0	0	1	0	0	0	0
Colorado	22	29	28	0	0	0	0	0	0	0	0	0
New Mexico	7	10	21	0	0	1	0	0	0	0	0	0
Arizona	19	24	26	0	0	0	19	0	0	0	0	0
Utah [2]	32	24	34	0	4	0	0	0	0	0	0	0
Nevada	0	4	------	0	0	0	0	0	0	0	1	0
PACIFIC												
Washington	38	76	49	0	0	0	0	1	0	0	1	0
Oregon	6	36	24	0	0	0	0	0	0	0	0	0
California	341	182	183	0	1	8	0	2	0	0	0	0
Total	4,254	3,864	3,893	0	17	141	43	12	0	0	14	70
2 weeks	7,902	7,728	7,728	------	------	------	------	------	------	------	------	------

[1] New York City only.
[2] Period ended earlier than Saturday.

WEEKLY REPORTS FROM CITIES

City reports for week ended January 2, 1943

This table lists the reports from 84 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga.	0	0	16	2	1	0	7	0	9	0	1	2
Baltimore, Md.	0	0	3	1	0	10	34	0	11	0	0	47
Barre, Vt.	0	0	------	0	2	0	0	0	0	0	0	0
Billings, Mont.	0	0	------	0	0	0	0	0	0	0	0	2
Birmingham, Ala.	0	0	------	0	1	1	7	0	4	0	0	0
Boise, Idaho	0	0	------	0	0	0	0	0	0	0	0	0
Boston, Mass.	0	0	------	0	43	1	24	0	79	0	2	33
Bridgeport, Conn.	0	0	2	0	0	0	3	0	2	0	0	0
Camden, N. J.	0	0	------	0	15	0	1	0	3	0	0	5
Charleston, S. C.	0	0	44	0	0	1	2	0	3	0	0	0
Chicago, Ill.	8	0	7	8	69	4	47	0	55	0	0	87
Cincinnati, Ohio	0	0	------	1	12	2	8	0	24	0	0	3
Cleveland, Ohio	2	0	5	0	4	2	15	0	46	0	0	50
Columbus, Ohio	0	0	2	2	1	0	5	0	21	0	0	2
Concord, N. H.	0	0	------	0	1	0	0	0	3	0	0	0
Cumberland, Md.	0	0	------	0	0	0	2	0	0	0	2	0
Dallas, Tex.	3	0	1	1	0	0	6	1	4	0	1	3
Denver, Colo.	2	0	18	1	12	1	6	0	3	0	0	6
Duluth, Minn.	0	0	------	0	1	0	3	0	3	0	0	0
Fall River, Mass.	0	0	------	1	0	0	2	0	2	0	0	18
Fargo, N. Dak.	0	0	------	0	0	0	0	0	3	0	0	0
Flint, Mich.	1	0	------	0	1	0	0	0	3	0	0	4
Fort Wayne, Ind.	0	0	------	0	0	0	0	0	0	0	0	0
Frederick, Md.	0	0	------	0	0	0	1	0	0	0	0	0
Galveston, Tex.	0	0	------	0	0	0	1	0	0	0	0	0
Grand Rapids, Mich.	0	0	------	2	0	0	4	0	1	0	0	8
Great Falls, Mont.	0	0	------	0	3	1	0	0	0	0	0	1
Hartford, Conn.	0	0	------	0	2	1	7	0	0	0	0	3
Helena, Mont.	0	0	------	0	0	0	1	0	0	0	0	1
Houston, Tex.	0	0	------	0	0	0	7	1	5	0	0	2
Indianapolis, Ind.	1	0	------	0	17	1	9	0	13	0	0	8
Kansas City, Mo.	1	0	------	0	0	0	8	0	27	0	0	3
Kenosha, Wis.	0	0	------	0	2	0	0	0	2	0	0	0
Little Rock, Ark.	0	0	------	0	0	1	3	0	2	0	0	1
Los Angeles, Calif.	3	0	17	3	24	3	8	2	26	0	1	18
Lynchburg, Va.	0	0	------	0	0	0	0	0	0	0	0	0
Memphis, Tenn.	0	0	7	3	4	1	5	0	3	0	0	9
Milwaukee, Wis.	0	0	2	2	47	0	8	0	64	0	0	20
Minneapolis, Minn.	0	0	------	0	0	0	4	0	24	0	0	3
Missoula, Mont.	1	0	------	0	3	0	1	0	2	0	0	0
Mobile, Ala.	0	0	1	2	0	0	3	0	2	0	0	0
Nashville, Tenn.	0	0	------	1	0	0	3	0	2	0	0	0
Newark, N. J.	0	0	8	0	27	1	14	0	8	0	0	4
New Haven, Conn.	0	0	------	0	1	0	3	0	1	0	0	1
New Orleans, La.	1	0	2	0	1	0	18	0	2	0	2	0
New York, N. Y.	13	4	15	2	21	12	103	0	165	0	1	86
Omaha, Nebr.	1	0	------	0	0	0	5	0	3	0	0	1
Philadelphia, Pa.	3	0	5	5	882	6	21	0	67	0	0	68
Pittsburgh, Pa.	3	0	5	2	4	3	11	0	9	0	0	38
Portland, Maine.	0	0	------	0	0	4	2	0	2	0	0	33
Providence, R. I.	0	0	------	0	0	3	4	0	6	0	0	13
Pueblo, Colo.	0	0	------	0	0	0	0	0	0	0	0	0
Racine, Wis.	0	0	------	0	28	0	0	0	33	0	0	1
Reading, Pa.	0	0	1	0	14	0	6	0	0	0	0	0
Richmond, Va.	5	0	1	0	2	1	10	0	4	0	1	0

City reports for week ended January 2, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Roanoke, Va	2	0	------	0	0	0	3	0	1	0	0	0
Rochester, N. Y	0	0	------	0	7	1	4	0	4	0	0	5
Sacramento, Calif	10	0	------	0	1	1	3	0	6	0	0	3
Saint Joseph, Mo	0	0	------	0	0	0	2	0	1	0	0	0
Saint Louis, Mo	2	0	------	0	0	6	13	0	7	0	1	10
Saint Paul, Minn	0	0	------	0	2	0	3	0	4	0	0	23
Salt Lake City, Utah	0	0	------	0	138	0	2	0	10	0	0	16
San Antonio, Tex	2	0	4	4	0	0	9	7	3	0	0	2
San Francisco, Calif	0	0	7	0	4	2	17	0	9	0	0	12
Savannah, Ga	0	0	2	2	0	0	3	0	1	0	0	0
Seattle, Wash	1	0	------	1	37	0	4	0	3	0	0	2
Shreveport, La	0	0	------	1	0	0	3	0	1	0	0	0
South Bend, Ind	0	0	------	0	0	0	0	0	2	0	0	1
Spokane, Wash	0	0	2	2	60	0	1	0	4	0	0	0
Springfield, Ill	0	0	------	0	1	0	0	0	4	0	0	10
Springfield, Mass			------	0	11	1	9	1	58	0	0	0
Superior, Wis	0	0	------	3	0	0	0	0	2	0	0	10
Syracuse, N. Y	0	0	------	0	1	1	4	0	1	0	0	26
Tacoma, Wash	0	0	------	0	35	0	3	0	0	0	0	0
Tampa, Fla	0	0	------	0	2	0	4	0	2	0	0	0
Topeka, Kans	0	0	------	1	9	0	0	0	2	0	0	0
Trenton, N. J	0	0	2	0	0	0	2	0	7	0	0	1
Washington, D. C	1	1	4	1	4	1	21	0	13	0	1	13
Wheeling, W. Va	0	0	------	0	1	0	2	0	2	0	0	3
Wichita, Kans	2	0	------	0	0	0	6	0	4	0	0	3
Wilmington, Del	0	0	------	1	3	0	2	0	2	0	0	2
Wilmington, N. C	0	0	------	0	0	0	2	0	0	0	0	1
Winston-Salem, N. C	0	0	2	0	0	0	3	0	0		0	2
Worcester, Mass	0	0	------	0	6	0	10	0	6	0	0	4

Dysentery, bacillary.—Cases: Birmingham, 1; Los Angeles, 2; Nashville, 1; New York, 7.
Tularemia.—Cases: New Orleans, 2; Philadelphia, 1; Pittsburgh, 1; Wichita, 1.
Typhus fever.—Cases: Houston, 3; Mobile, 2; Savannah, 1.

Rates (annual basis) per 100,000 population for the group of 84 cities included in the preceding table (estimated population, 1942, 31,670,947)

Period	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
		Cases	Deaths						
Week ended Jan. 2, 1943	11.20	30.46	9.06	257.99	95.33	149.82	0.00	2.14	120.68
Average for week 1937–41	18.43	172.00	[1] 12.40	[2]242.90	[1] 78.20	162.21	2.99	2.82	160.38

[1] 3-year average, 1939–41.
[2] 5-year median.

PLAGUE INFECTION IN TACOMA, WASH.

Plague infection has been reported proved in pools of fleas and in tissue from rats, all *R. norvegicus* except as otherwise stated, collected in Tacoma, Wash., as follows:

December 14, 20 fleas from 14 rats; December 18, 12 fleas from 33 rats, *R. rattus*, 26 fleas from 6 rats, *R. alexandrinus*, and 32 fleas

from 18 rats; December 19, tissue from 1 rat; December 21, 10 fleas from 15 rats, *R. rattus*, and 8 fleas from 7 rats; December 22, tissue from 39 rats; December 23, 43 fleas from 82 rats; December 24, tissue from 3 rats, proved separately; December 28, 125 fleas from 36 rats and tissue from 1 rat; December 29, tissue from 5 rats.

TERRITORIES AND POSSESSIONS

Hawaii Territory

Plague (rodent).—During the week ended December 26, 1942, 2 rats proved positive for plague were reported in Paauhau area, Hamakua District, Island of Hawaii, T. H. During the week ended January 2, 1943, 1 rat proved positive for plague was reported in Kapulena area and 2 rats proved positive for plague were reported in Paauhau area, all in Hamakua District, Island of Hawaii, T. H.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended December 19, 1942.—During the week ended December 19, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis				5	3				2	10
Chickenpox		19		363	432	104	67	13	89	1,087
Diphtheria		21	2	42	1	14	2	3	3	88
Dysentery				4						4
German measles				33	5	1		1	10	50
Influenza		41				3			19	63
Measles		4		66	84	14	33	1	27	229
Mumps	1	119		64	689	50	65	74	225	1,287
Pneumonia		17			18	2			6	43
Poliomyelitis				1	1		1			3
Scarlet fever		4	4	97	97	13	18	20	120	373
Tuberculosis	4	3	10	139	49	9		2	39	255
Typhoid and paratyphoid fever	1			17	2		1	3		24
Whooping cough		27	1	163	78	31	5	17	18	340
Other communicable diseases		12		1	176	42	2		103	336

CUBA

Provinces—Notifiable diseases—4 weeks ended December 5, 1942.—During the 4 weeks ended December 5, 1942, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana[1]	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	1		4	16		15	36
Cerebrospinal meningitis		1					1
Diphtheria		33	1	7	2	5	48
Hookworm disease		23					23
Malaria	218	43	2	133	12	313	721
Measles				1		23	24
Poliomyelitis		2	3	14	6	4	29
Tuberculosis	20	15	20	33	8	52	148
Typhoid fever	10	34	10	30	5	28	117
Whooping cough						1	1
Yaws						2	2

[1] Includes the city of Habana.

HAITI

Anthrax.—About the middle of December 1942, an outbreak of anthrax occurred among cattle and hogs in Kenscoff, Haiti, about 15 miles from Port-au-Prince. No human cases have been reported.

IRISH FREE STATE

Poliomyelitis.—According to a report dated November 19, 1942, a total of 39 cases of poliomyelitis was reported in Irish Free State for 1942 up to and including September 5, 1942. The numbers of cases of

poliomyelitis reported by weeks subsequent to September 5, are as follows:

Week ended—	Cases reported	Week ended—	Cases reported
Sept. 12	15	Oct. 17	20
Sept. 19	27	Oct. 24	28
Sept. 26	24	Oct. 31	17
Oct. 3	22	Nov. 7	18
Oct. 10	28	Nov. 14	23

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-named diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday of each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Cholera

China—Shanghai.—Cholera has been reported in Shanghai, China, as follows: For the period July 19–October 3, 1942, 825 cases; week ended October 10, 15 cases; week ended October 24, 3 cases.

Plague

Ecuador—Loja.—During the week ended December 12, 1942, 1 fatal case of plague was reported in the city of Loja, Ecuador.

Smallpox

Turkey.—During the 2 weeks ended December 26, 1942, 300 cases of smallpox were reported in Turkey.

Typhus Fever

China—Shanghai.—For the period July 19 to October 10, 1942, 101 cases of typhus fever were reported in Shanghai, China.

Hungary.—For the week ended December 19, 1942, 14 cases of typhus fever were reported in Hungary.

Indochina.—For the period November 21–30, 1942, 10 cases of typhus fever were reported in Indochina.

Rumania.—For the week ended December 5, 1942, 75 cases of typhus fever were reported in Rumania. For the week ended December 12, 132 cases were reported.

Slovakia.—For the week ended December 12, 1942, 4 cases of typhus fever were reported in Slovakia.

Turkey.—For the 2 weeks ended December 26, 1942, 23 cases of typhus fever were reported in Turkey.